| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/001,613 | 10/31/2001 | Taro Imagawa | 29288.3900 | 1178 |

| 20322 7590 10/19/2004 | EXAMINER |
|---|---|
| SNELL & WILMER | CHANG, JON CARLTON |
| ONE ARIZONA CENTER | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2623 | |

SNELL & WILMER
ONE ARIZONA CENTER
400 EAST VAN BUREN
PHOENIX, AZ 850040001

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/001,613 | IMAGAWA ET AL. |
| | Examiner | Art Unit |
| | Jon Chang | 2623 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL**.     2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4) ☒ Claim(s) *1-13* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1,2,4 and 7-13* is/are rejected.

7) ☒ Claim(s) *3,5 and 6* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

## Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *31 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some * c)☐ None of:

         1. ☒ Certified copies of the priority documents have been received.

         2. ☐ Certified copies of the priority documents have been received in Application No. _____.

         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

### *Claim Rejections - 35 USC § 101*

1.      35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.      Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

Claim 12 is directed toward a program. A program, *per se*, is not considered

statutory subject matter.

### *Claim Rejections - 35 USC § 102*

3.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4.      Claims 1, 2, 7 and 11-13 are rejected under 35 U.S.C. 102(e) as being

anticipated by U.S. Patent 6,647,139 to Kunii et al. (hereinafter "Kunii").

As to claim 1, Kunii discloses an object recognition apparatus, comprising:

an input section for inputting a first image set including a predetermined number

of images including a first image representing a first target object using a first attribute

and a second image representing the first target object using a second attribute different

from the first attribute, wherein the predetermined number is two or more (column 9, lines 15-18; attributes are for example, visible and infrared);

a feature vector calculation section for calculating a first feature vector in a feature space having at least one filter output value as a vector component, the at least one filter output value being obtained by applying at least one predetermined image filter to at least one predetermined position in the predetermined number of images in the first image set (column 9, lines 40-41; column (column 6, lines 4-6 and 15-67; column 7, lines 1-30; the position is determined by the window, and the calculation of the feature vector is effectively a filtering); and

a judgment section for judging whether or not the first target object is categorized into a specific category based on a relationship between the first feature vector and predetermined discriminant parameters (column 7, lines 43-56).

As to claim 2, Kunii discloses an object recognition apparatus according to claim 1, wherein: the input section further inputs a plurality of image sets each including the images of the predetermined number, the plurality of image sets including at least one second image set and at least one third image set other than the at least one second image set (note that Kunii's system allows for an indefinite number of images (Fig.7, block 81), each image of the at least one second image set including a third image representing a second target object belonging to the specific category using the first attribute and a fourth image representing the second target object using the second attribute (the object exists in each image, i.e., "second target object"; column 9, lines 12-18); the feature vector calculation section further calculates a feature vector in a feature

space having at least one filter output value as a vector component, the at least one

filter output value being obtained by applying at least one predetermined image filter to

at least one predetermined position in the predetermined number of images in the said

input plurality of image sets (column 6, lines 4-6 and 15-67; column 7, lines 1-30; the

position is determined by the window, and the calculation of the feature vector is

effectively a filtering, which would occur for each image); and the object recognition

apparatus further includes a learning section for calculating the discriminant parameters

so as to discriminate at least one feature vector in the feature space for the at least one

second image set from at least one feature vector in the feature space for the at least

one third image set (note use of learning images, Fig.7, block 82).

As to claim 7, Kunii discloses an object recognition apparatus according to claim

1, wherein the first image represents an intensity of light having a first wavelength band

emitted or reflected by the first target object (column 9, lines 15-17; e.g., visible

wavelength band), and the second image represents an intensity of light having a

second wavelength band different from the first wavelength band emitted or reflected by

the first target object (column 9, lines 15-17; e.g., infrared wavelength band).

With regard to claim 11, the discussion provided above for claim 1 is applicable.

With regard to claims 12 and 13, the discussion provided above for claim 1 is

applicable. The computer program and computer-readable recording medium are

inherent to the computer system (Fig.4).

## *Claim Rejections - 35 USC § 103*

5.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.      This application currently names joint inventors.  In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary.  Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

7.      Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kunii.

As to claim 8, Kunii discloses an indefinite number of images (Fig.7, block 81),

but does not specify the times at which the image are taken.  However, it would have

been obvious to capture sets images with the different input means (column 9, lines 15-

16) at the same time in order to properly relate the images for recognizing the object.

Further, it would have been obvious to capture different sets of images at different

times, for example, to recognize other objects in other scenes.  In other words, it would

have been obvious to one of ordinary skill in the art to utilize the system more than once

to recognize additional objects.

Regarding claim 9, Kunii is not explicit as to the input section is configured so

that the first image is captured at a first site, and the second image is captured at a

second site different from the first site. However, it would have been obvious to one of

ordinary skill in the art to utilize the system at whatever site the object to be recognized

resides in. A similar argument is applicable to claim 10.


8.      Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the

combination of Kunii and "Digital Image Processing" by Gonzalez et al. (hereinafter

"Gonzalez").

Regarding claim 4, Kunii does not disclose that: the discriminant parameters

represent a discriminant surface in the feature space; and the judgment section judges

whether or not the first target object is categorized into the specific category based on

which side of the discriminant surface the first feature vector is present. However, this

is exceedingly well known in the art. For example, Gonzalez teaches a discriminant

surface in feature space, and categorizing based on which side of the surface the

feature vector is present (see section 9.3.1, and Fig.9.6. Kunii utilizes a type of

minimum distance classifier (note column 7, lines 43-51). The use of the discriminant

surface provides a very simple way of classifying feature vectors. Therefore, it would

have been obvious to one of ordinary skill in the art to modify Kunii's system according

to Gonzalez.

## *Allowable Subject Matter*

9.      Claims 3, 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

## *References Cited*

10.     The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,850,470 to Kung et al. discloses a neural network for recognizing faces. The patent discloses a multi-channel embodiment which utilizes multiple sensors, fusion of the sensor information, as well as a discriminant function and training.

U.S. Patent Application Publication 20020136435 to Prokoski discloses a dual band biometric identification system which utilizes visual and IR bands to recognize faces.

"Distinguishing Point Targets from Decoys by Fusing Thermal and Visual Images" by Liu et al. teaches fusing information from thermal and visual images.

"Detecting Buried Objects by Fusing Dual-Band Infrared Images" by Clark et al. teaches fusing information from two infrared band images.

"Comparison of Visible and Infra-Red Imagery for Face Recognition" by Wilder et al. teaches recognizing faces by fusing visible and infra-red decision metrics.

### *Contact Information*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon Chang whose telephone number is (703)305-8439. The examiner can normally be reached on M-F 8:00 a.m.-6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jon Chang
Primary Examiner
Art Unit 2623

Jon Chang
October 18, 2004